AIRSTACK

ASP30, ASP20, ASP15, ASP13, ASP10
ASP-OOP, ASP-OOF

Air Cooled Packaged Modules
OPERATION & MAINTENANCE

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1.0 Chiller Identification

The module information data plate is located inside the electrical box compartment of each module. When ordering service parts or inquiring for technical assistance it is important to provide the model and serial number.

1.1 ASP Model Number

ASP15HV

ASP = Airstack Packaged

15 = tons	10,13,20, 30 = tons	00F = free cool	00P = pump module	
HV = 460V	AV = 208V	LV = 230V	CV = 575V	V = special

1.2 Serial Number Identification

JC-06-25

J = --0- (decade built)	I = 1990's	J= 2000's	
C = ---3 (year built)	A= '01	B= '02	…….
06 = June (month built)	01 = Jan.	02 = Feb.	…….
25 = 25th module built	01 = 1st	02 = 2nd	……..

2.0 Theory of Operation

The Airstack ASP chiller provides chilled water to an external load based off of the return water temperature to the ASP master control. When the Entering Chilled Water sensor sends the signal to the master control that cooling is needed, compressors will begin to start and produce chilled water. The point at which the ECHW temperature calls for compressors to start is determined by the Upset-point and the Variable Set-point setting in the system variables menu of the master control.

When the ECHW sensor senses that the chilled water temperature has dropped below the set-point, compressors will begin to cycle off.

3.0 Daily Log Sheet

On the back page of this manual is a chiller information log sheet. The log sheet can be used daily, weekly or as desired to record operation characteristics of the chiller. The information recorded on the log sheet can also be very helpful for diagnosing potential problems in the system.

4.0 Pressure Readings

The operating suction and discharge pressures in the system are directly related to water flow, condenser temperatures, chilled water set-points, and the cleanliness of the system.

All ASP modules have a high pressure cut out safety device. Each circuit will cut out on HP when the programmed setting limit in the master control is met. In addition a back up HP cut out switch is installed on each module. The HP cut out is 365 psig for both R-22, and R-407C.

Each ASP module also has a low pressure safety cut out. The LP cut out is controlled by a setting in the program chip of the module. The LP cut out for modules with R-22 or R-407C is 15 psig.

If circuits are faulting on HP fault you should first check to see that the fans are operating. If both fans are working check the cleanliness of the condenser coil.

A LP fault is an indication of low refrigerant charge in the system. If a circuit is going out on a LP fault check the static pressure of the system while the circuit is in the off mode. If pressures are low check the circuit for possible leaks. The circuit can be pressurized to 15 psig with refrigerant and topped to 160 psig with dry Nitrogen.

5.0 Strainer Cleaning

All ASP modules have a 30 mesh filter cartridge in the chilled water inlet header. The purpose for the filter cartridge is to keep debris from entering the heat exchanger. An external “Y” or basket type system strainer should also be installed as a pre-filter to the factory supplied strainers.

There is no set time for cleaning the filter cartridges. The frequency of this process is dependant on the water quality in the evaporator loop. Normally, debris in a water loop is going to take the path of least resistance and build up on the last modules to receive water.

If circuits are faulting on Low Suction Temperature, or Low Chilled Water Temperature the chilled water inlet filter cartridge should be checked. The strainers are located in the top header on the CHW side. If the strainers are clean the fault is most likely being caused by a low flow condition or too low of set-points in the master control. If these possibilities are eliminated the evaporator heat exchangers may need cleaning.

Steps to remove the strainers for cleaning

1. Stop CHW pump and shut down chiller
2. Close inlet and outlet water valves to the chiller
3. Drain the water/glycol from the top header in the end module so the strainers can be removed.
4. Remove the 4" Victaulic end cap on last module.
5. Remove strainers and clean. You may need to make a tool to hook the other strainers for removal.
6. Re-install clean strainers.
7. Open the bottom water isolation valve and fill unit from the bottom up to prevent air from being trapped.
8. Restart CHW pump, bleed any air and start chiller.

6.0 Compressor Oil Level

Compressors used on ASP modules are oil charged by the compressor manufacturer. These compressors do not have an oil level sight glass indicator

To ensure no liquid is present in the oil the crankcase heaters should be on 24 hrs. before starting of the compressors.

Factory oil charge volume for each compressor can be found in the *Product Data Catalog.*

7.0 Refrigerant Charge / Evacuation

All ASP modules come factory charged with the recommended refrigerant volume. Prior to charging, each circuit is evacuated to a maximum of 150 microns and held 15 minutes. The proper refrigerant charge for each module can be found on the module data plate.

On air cooled machines the proper charging procedure is by a calculated weigh in method. Charging to a full sight glass on air cooled machines will likely result in over charging as the elbows in the liquid line as well as the liquid line solenoid valve still produce some flashing even with the correct charge. As fans are cycling the sight glass will also display some bubbling.

8.0 Filter Driers

ASP modules have short refrigerant pipe runs, but a higher refrigerant charge due to the copper fin condenser and exposure to lower ambient conditions. These modules are built with a factory installed liquid line filter drier. The filter driers are a solid core sweat fitting replaceable type. In the case of a compressor failure, heat exchanger failure, or water contamination in the system, it is always recommended to replace the drier.

9.0 Superheat / Subcooling

ASP modules use a mechanical type expansion valve on all modules. By turning the valve adjustment clockwise superheat is increased.

On each module, superheat is set at the factory during the run test. Superheat is set for 10 – 12 degrees during the test run.

Subcooling is necessary in the system to prevent flash gas as the refrigerant enters the expansion valve. ASP condensers are sized so that subcooling of the liquid refrigerant will take place with no separate subcooler being needed. The general range of subcooling seen is 7- 15 degrees.

10.0 Pressure Relief Valve

Each module has a 450 psig pressure relief valve. The relief valve is installed on the receiver of the module and has a 3/8" flare connection.

11.0 Annual Maintenance

Most of the annual maintenance requirements for ASP Chillers involve proper shut-down of the machine, and if needed cleaning of the heat exchangers. *Preventative Maintenace bulletin #021594PM* and *Heat Exchanger Cleaning Procedures bulletin #091594CP* describe the recommended procedures for both processes. Airstack has available the 151A Cleaning Kit to assist with this process. Please see the *151A Cleaning Kit bulletin # 090195CK* for more details. All of these bulletins are part of the standard O&M manual package.

Annual Maintenance Checks

Electrical Components

a. check all external interlocks
b. inspect compressor terminals
c. check compressor crankcase heater operation
d. tighten all contactor, relay and circuit breaker terminals.
e. check and calibrate all compressor safety controls.
f. check and record voltages and amperages for compressors.
g. check and record amperages for pumps and condenser fans.
h. check and calibrate low ambient/ fan cycling controls.
i. inspect relay contacts for damage or pitting

Refrigeration Circuits

a. analyze refrigerant with tube type moisture/acid analyzer.
b. check and record refrigerant subcooling and superheat.
c. check liquid solenoid valves
d. check expansion valve and sensing bulb connections.

Chilled Water System

a. clean pump strainers and system strainers.
b. remove header caps and clean the ECHW strainers in accordance with the Multistack™ Annual Cleaning Procedure detailed in Section 5 of this manual
c. check glycol, inhibitor content in system chilled water.

Cabinet and Related Hardware

a. dry clean electrical panels, remove debris.
b. apply protective coatings or wax if required.

Update Your Maintenance Log Book!

12.0 Compressors

With any chiller system there is always the chance of a compressor failure. In the event of a failure, proper steps should be taken to determine the cause of the failure.

A motor burn due to a fault in the motor insulation is quite rare. Most burnouts are actually caused by a mechanical condition or lubrication problems. In the event of a burnout, proper clean up procedures should be followed.

1. Check all electrical components of the circuit (contactors, fuses, wires, etc.)
2. If necessary do a system clean up. Nu-Calgon RX-11 flush, or Sporlan System Cleaner work well.
3. Replace the liquid line filter drier with burnout core. *See section 7 on filter driers.*
4. Evacuate the system to a minimum of 500 microns and hold for 20 minutes.
5. Charge the circuit with virgin refrigerant. Charge with liquid into the discharge side. *See refrigerant charge on nameplate data of unit.*
6. Run the system 2-3 weeks with burnout filter core. Replace with standard core drier.

13.0 Heat Exchangers

Airstack uses brazed plate stainless steel heat exchangers for all evaporators. Without proper water treatment or due to abuse, heat exchangers can corrode over time and eventually develop an internal leak. In such an event it would become necessary to replace the heat exchanger.

Following are the step's for field replacement of a failed evaporator heat exchanger.

1. If the refrigerant has not been lost on the failed circuit, you should first do a standard refrigerant recovery.
2. Begin by isolating the chiller and draining the water/glycol from the loop.
3. Remove the 4" round header pipes that attach to the evaporator (if you have a front module). If rear module remove the crossover pipes from the front module.
4. Cut the refrigerant lines below the elbows and sweat off remaining pipe.
5. Remove old evaporator and replace with new one.
6. Fit in copper connections and braze. Purge with Nitrogen while brazing.
7. After brazing leak check and evacuate to a maximum of 500 microns. Charge the circuit according to the name plate charge.

If the evaporator heat exchanger failure has caused water to enter into the refrigerant side, the compressor and condenser should also be checked for possible contamination. If water has entered into the compressor it is

recommended the compressor be replaced as removing all the moisture from the oil is very difficult. Replacement of the condenser, the expansion valve, and installation of a liquid line filter drier with a water core cartridge is also recommended. Evacuate the circuit to a maximum of 500 microns and let stand for 20 minutes. Charge the circuit and run 2-3 weeks with the high water core cartridge and then replace with a standard core.

The condensers on the ASP module are all copper coil with aluminum fin type. Period cleaning of the fin's should be done to keep air-born debris from plugging up the fins and causing high pressure conditions. A coil cleaner suitable for copper and aluminum can be used for this.

14.0 Troubleshooting Air Cooled Packaged Modules

ASP modules use the Carel PCO2 master control. The user manual for the PCO2 controller is located in *section 6 of the O&M package*. The user manual details the different status screens and explanations of system or module faults. The following guide is for troubleshooting ASP modules and the PC02.

FAULT	SOLUTION
No Display on Master Module	Check main disconnect for power Check circuit breakers in module Check transformer in modules Check for 24V at J1 on board
EX 1,2, Interlock	Check appropriate interlock component Check jumpers on TS2 in master module
EX 4 Interlock	Check for proper rotation, phasing Check PPM device
Waiting For Chilled Water Flow	Check CHW pump Check flow switch operation Check filter strainers Check TS2 inputs #3 - #5
Low Chilled Water Temp	Check LCHW sensor Check setpoints in system variables Check for flow restriction
No Demand	Check entering CHW sensor Check setpoints in system variables

	Check sensor location
100% Demand all the time	Check entering CHW sensor Check setpoints in system variables
100% Demand, chiller won't load	Turn chiller on Check sensors Check load limit setting in system variables
Excessive Cycling	Check VSP setting is system variables Check entering CHW sensor location
High Discharge Pressure (HP)	Check fan operation Check coil condition Check fan settings in system variables
Low Suction Pressure (LP)	Check refrigerant charge / leaks Check expansion valve
Low Suction Temperature	Check suction sensor Check setpoints in system variables Check for flow restriction
Communication Error	Check settings in system variables Check cables at J11 comm ports Check dip switch settings
Circuit Fault	Check components in control circuit Check wire crimps in control circuit
P Lan Error	Check for possible airwave interference

III AIRSTACK CHILLER DAILY LOG SHEET

	DATE					
	Status	Suct. Press	Head Press	Suct. Temp	LoChw Temp	Fault (if any)
Comp #1						
Comp #2						
Comp #3						
Comp #4						
Comp #5						
Comp #6						
Comp #7						
Comp #8						
Comp #9						
Comp #10						
Comp # 11						
Comp #12						
	Ent. Chw	Lvg. Chw			Demand	Capacity
System						
	Upset	Loset	VSP	Load Limit	Tdiff	Index
System						
COMMENTS:						